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GIACOBINI'S comet, but, like the latter, has passed perihelion, and is receding from the Earth. It is not likely, therefore, to remain visible very long.

R. G. AITKEN.

January 24, 1905.

NOTE ON TWO INTERESTING BINARIES IN *CETUS*.

The star *Ceti* 82, was found to be a close double star by BURNHAM in 1875, but no accurate measures were made until 1886. The observed motion in the next five years was very slow, but that the pair would ultimately prove to be an interesting physical system was evident from the large proper motion common to the two components—about $1''.4$ annually in the direction 90° .

The star was not observed from 1891 to 1897, but in the latter year SEE measured it and found a remarkable change.

The companion-star was now in the fourth quadrant instead of the second, and less than half as far from its primary as in 1891. Dr. SEE computed an orbit and found a period of only 16.3 years, but the observational data were at that time insufficient for accurate conclusions, and later measures have indicated a very different orbit. I have followed this pair regularly since 1897, and with the aid of the additional data thus secured have now computed an orbit which will, I hope, at least approximate the truth. The details of this computation will be printed as one of the *Bulletins* of the Lick Observatory; it will therefore be sufficient here to give the mean of my most recent observations and the elements of the computed orbit. The mean of two measures in December is:—

$$1904.96 \quad 332^\circ.8 \quad 0''.20$$

And the elements are:—

$$\begin{array}{ll} P = 24.0 \text{ years} & \Omega = 110^\circ.8 \\ T = 1899.7 & \omega = 159.4 \\ e = 0.15 & i = \pm 76.65 \\ a = 0''.66 & \mu = + 15.00 \end{array}$$

Apparent motion direct.

Another interesting binary in this constellation is 13 *Ceti*. This star has had a peculiar history. In 1877 BURNHAM catalogued a distant companion, but saw nothing unusual about the bright star. In 1886, however, HOUGH, with the same tele-

scope, found the bright star to be a close double. He also secured one measure in the following year. In 1890 and 1891 the star appeared round to BURNHAM when he examined it with the 36-inch telescope under good conditions, but in 1899 SEE found it an easy pair to measure with the 26-inch at Washington, and I have measured it every year since then with the 36-inch telescope. My last measures give:—

1904.96 12°.8 0".12 2ⁿ

The companion has apparently described an arc of nearly 300° since its discovery by HOUGH in 1886, and it is evident that the revolution period will be very short—certainly less than twenty-five years. It would not be difficult to construct an orbit that would represent all the observations so far made and that would also satisfy the condition that the apparent separation of the two components must be assumed to be very small in 1877 and in 1890 and 1891, when BURNHAM failed to see the star double. Such an orbit would probably define the revolution period, the inclination, and some of the other elements with a fair degree of accuracy, but others, and especially the eccentricity, would be very uncertain, depending almost wholly on HOUGH's estimates (not measures) of distance on two nights only. It will be more satisfactory to wait a few years until further measures have supplied data for an accurate orbit.

R. G. AITKEN.

January 25, 1905.

NORMAL PLACES OF THE *EROS* REFERENCE-STARS.

Since the inauguration of the work of determining the solar parallax from observations upon the planet *Eros*, the discussions in current astronomical literature as to the proper combination and use of observations have been very extensive. Not the least among the points of controversy has been the proper use of the meridian-circle observations employed.

To those who have been noting the progress of the *Eros* work it will be a source of gratification to learn that the stars observed by the meridian-circle have been reduced to a normal system which will be used without further discussion by those employed on the *Eros* work. The catalogue of the normal places is published in Circular No. 11 of the Conférence Pho-